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Soil and Air Resource Management

Managing the health and productivity of soils and quality of air resources needed for, and impacted by, agriculture

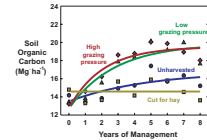
Expected results

1. Management strategies and technologies for agricultural producers and land managers to enhance soil and air quality
2. Science-based information for Federal and State Agencies to assist in policy and regulatory decisions

Evaluating whether to till or not to till



Determining soil organic carbon sequestration rates



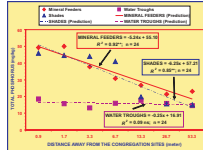
Controlling oxidation of organic soils to avoid subsidence



Evaluating soil quality under conservation tillage



Evaluating soil nutrient distribution under grazed pastures



Evaluating cover crop effects on soil processes



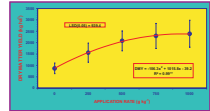
Assessing cattle impact on soil quality



Binding phosphorous in water treatment residuals



Evaluating lake sludge on pasture productivity and soil quality



Measuring the effects of animal manure application on crop growth and quality



Water Availability and Watershed Management

Developing practices and technologies to manage the Nation's agricultural water resources

Research focus areas

1. Developing methods to reuse degraded water and increase water use efficiency and water availability to mitigate impacts of drought
2. Developing practices and tools to quantify and predict the impact of conservation practices and their net cumulative benefits within watersheds
3. Developing technology and strategies to restore stream corridors and reduce soil erosion and sedimentation
4. Developing technology and strategies to reduce the transport of nutrients, pathogens, and pharmaceutically active compounds to enhance water quality

Expected results

Technologies to manage and deliver safe and reliable fresh water supplies to the agricultural, urban, and industrial sectors of society while enhancing the aquatic resources of the Nation

Working with the community to assess environmental impacts



Devising methods to assess in-field water runoff quality



Assessing water runoff quantity and quality in grazed pastures



Evaluating stream quality in agricultural landscapes



Assessing alum treatment and wetland best management practices for stormwater management



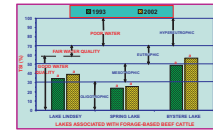
Monitoring water quality with rural and urban influences



Studying riparian zones in agricultural watersheds



Evaluating lake water quality adjacent to pastures grazed by cattle



Studying agro-chemical movement under different management



Agricultural Waste and Byproduct Utilization

Utilizing manure and other byproducts as resources rather than wastes

Research focus areas

1. Developing management practices, control technologies, and decision tools that allow effective use of manure, industrial, and municipal byproducts without degrading environmental quality or threatening human and animal health
2. Reducing or eliminating atmospheric emissions, loss of nutrients and offsite transport of pathogens and pharmaceutically active compounds from animal production operations
3. Evaluating industrial and municipal byproducts for benefits and risks
4. Developing guidelines for safe and effective use of byproducts

Expected results

Increased use of byproduct materials in agriculture to enhance recycling, lower production costs, improve soil properties, reduce energy use, and provide feedstocks for energy production

Evaluating gas emissions from treatment lagoons



Reducing ammonia emissions from confined swine operations with advanced treatment technologies



Determining the impact of animals on greenhouse gas emission and mitigation through soil organic carbon sequestration



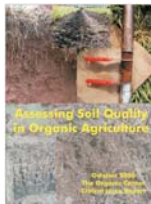
Evaluating cattle manure on pasture productivity and soil quality



Optimizing poultry litter application to pastures



Measuring survival of fecal pathogens in waste lagoons



Exploring alternatives



Using global positioning systems to improve economics and resource efficiency



Using drip irrigation to conserve water in peanut



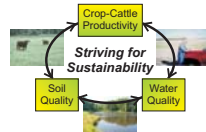
Transferring technology



Evaluating the effectiveness of conservation practices



Developing integrated crop-livestock systems



Working with farmers to attain realistic goals



Agricultural System Competitiveness and Sustainability

Integrating information and technologies to develop new practices and dynamic systems to enhance productivity, profitability, energy efficiency, and natural resource stewardship for different kinds and sizes of American farms

Research focus areas

1. Identifying new configurations of practices that utilize on-farm resources and natural ecosystem processes to reduce the need for purchased inputs and reduce production costs and risks
2. Developing precision management, automation, and decision-support technologies to increase production efficiencies and enhance environmental benefits
3. Developing strategies for sustainable production of bio-based energy products from farms
4. Developing production systems that incorporate consumer preference and supply-chain economic information to expand market opportunities for agricultural and other value-added bio-based products

Expected results

Diverse and improved agricultural systems to support the long-term financial viability, competitiveness, and sustainability of farms and rural communities, and increase food and fiber security for the USA and the world



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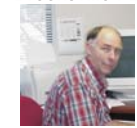


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